PROVISIONAL INTELLIGENCE REPORT

PRODUCTION AND USE OF SHORT-WAVE RADIOBROADCAST RECEIVERS IN THE SOVIET BLOC

CIA/RR PR-165
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CENTRAL INTELLIGENCE AGENCY

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(ORR Project 36.1109)

NOTICE

The data and conclusions contained in this report do not necessarily represent the final position of ORR and should be regarded as provisional only and subject to revision. Comments and data which may be available to the user are solicited.

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FOREWORD

This report establishes the number of short-wave radiobroadcast receivers in use in the USSR and in the European Satellites at the end of 1956. This information, not generally available in comprehensive detail, is believed to be of great potential use to those agencies of the US and allied governments responsible for establishing communication with peoples in the Soviet Bloc. Much of this information is included in this report in response to requests from the EIC Electronics Subcommittee.

The report has been prepared at the specific request of the AD/SI for use and reference by international broadcasting organizations. The data in this report are intended to provide background information to permit international broadcasting organizations to plan for optimum utilization of short-wave receiving capabilities by the Soviet Bloc.

Providing general information on the numbers of various categories of civilian radiobroadcast receivers produced and in use in the Soviet Bloc, this report brings up to date, expands, and revises CIA/RR PR-82, Foreign Radiobroadcasting Reception Potential in the USSR, 21 October 1954, SECRET/US OFFICIALS ONLY.

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(ORR Project 36.1109)

S-E-C-R-E-T

PRODUCTION AND USE OF SHORT-WAVE RADIOBROADCAST RECEIVERS IN THE SOVIET BLOC*

Summary

Between 20 million and 25 million civilian radiobroadcast receivers** are estimated to have been in use in the Soviet Bloc at the end of 1956. One-half of the receivers in use, or between 10 million and 12 million, are estimated to have short-wave bands. These receivers with short-wave bands are capable of receiving radiobroadcasts from outside the Bloc. Distribution of receivers by country is believed to be roughly parallel to production.

The Soviet Bloc is estimated to have produced 30 million receivers during 1945-56. The major producers were the USSR, East Germany, and Czechoslovakia, which produced about 57 percent, 17 percent, and 10 percent of the total, respectively.

The annual production of receivers in the USSR increased from 100,000 in 1945 to approximately 1 million in 1950. In 1956 the USSR produced 3.6 million receivers, an increase nearly 4 times above the level of production in 1950, and it is planned that production in 1960 will more than double that in 1956. Production of receivers by the European Satellites, which was negligible in 1945, increased from 766,000 in 1950 to 2,370,000 in 1956.

About 15.7 million receivers, or more than one-half of the 30 million receivers produced by the Soviet Bloc, have short-wave bands.*** The

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* The estimates and conclusions contained in this report represent the best judgment of ORR as of 15 May 1957.

** The civilian radiobroadcast receivers are referred to as receivers in this report. These receivers are used by individuals or groups of individuals in homes and clubrooms for receiving programed radiobroadcasts. These receivers are similar to the standard amplitude modulated home receivers used in the US with the exception of the characteristics of reception associated with radio frequencies.

*** Short-wave bands are bands found in the range of radio frequencies between 3 megacycles per second (mc) and 30 mc. In recent years the average US home receiver which used amplitude modulation ranged through the standard broadcast band of 550 to 1,650 [footnote continued on p. 2]

USSR produced about 7.1 million receivers with short-wave bands, or approximately 45 percent of the total. East Germany, Czechoslovakia, Poland, and Hungary rank next in order. Slightly more than 6 million receivers, or about 40 percent of the receivers with short-wave bands, can receive frequencies of 15 mc or above. Czechoslovakia was the largest producer of this type of receiver, with East Germany, the USSR, Hungary, and Poland next in order.

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kilocycles per second (kc). Civilian receivers of the Soviet Bloc usually have at least two bands -- the long-wave band and the medium-wave band. The long-wave band normally ranges through frequencies of 150 to 450 kc. Better quality receivers (about one-half of all receivers produced by the Bloc) have one or more short-wave bands which extend the capability for reception of the receivers into the short-wave band. Usually these receivers can receive frequencies about 4,000 to 12,000 kc, and the best receivers even can receive frequencies as high as 26,000 kc.

1. USSR.

The USSR produced about 17 million receivers during 1945-56. In 1945, production amounted to about 100,000 receivers, and it is estimated that, in 1956, 3.6 million receivers were produced. Continued increases in annual production are indicated through 1960. Production planned for the year 1960 is 7.7 million receivers.

Slightly more than 7 million receivers, or 41 percent, of the 17 million receivers produced during 1945-56, are estimated to be capable of short-wave reception. (See Tables 1 and 2.*) Production of receivers capable of receiving frequencies above 12 mc has been restricted since 1953.

It is estimated that there are in the USSR 680,000 receivers with short-wave bands ranging through 15 mc and 350,000 with short-wave bands ranging through 17 mc. Receivers capable of receiving frequencies up to 17 mc can also receive frequencies of 15 mc. Thus the total number of receivers capable of receiving frequencies through 15 mc is the sum of those receiving 15 mc and 17 mc, or about 1 million receivers.

It is estimated that about 9.6 million receivers were in use in the USSR at the end of 1956. (See Table 3.**) Total production of receivers during 1945-56 exceeds the estimate of the number of receivers in use by approximately 7.6 million. In the USSR, about 56 percent of the total number of receivers produced during 1945-60 will be in use during this period compared with 58 percent for a similar period in the US. The major portion of the 7.6 million Soviet receivers which are not in use are believed to be accounted for by replacements and unlicensed receivers.

* Tables 1 and 2 follow on p. 4 and 5, respectively.
** Table 3 follows on p. 5.

Table 1

Estimated Production of Radiobroadcast Receivers in the Soviet Bloc
by Capability for Frequency Reception
1945-56

Country	Short-Wave						Non-Short-Wave	Total d/	Percent of Soviet Bloc Total
	Total Short-Wave a/	12 mc b/	15 mc b/	17 mc b/	21 mc b/	26 mc b/ c/			
	Thousand Units								
USSR	7,100	6,060	680	360	Negligible	0	10,100	17,200	57.1
European Satellites									
Albania e/	0	0	0	0	0	0	Unknown	0	0
Bulgaria f/	150	90	10	50	0	0	270	420	1.4
Czechoslovakia g/	2,300	50	280	700	570	700	670	2,970	9.9
East Germany h/	3,100	1,650	290	1,160	0	0	2,150	5,250	17.4
Hungary i/	1,000	360	100	200	290	50	630	1,630	5.4
Poland j/	1,800	1,240	370	190	Negligible	0	270	2,070	6.9
Rumania k/	210	0	130	70	10	0	350	560	1.9
Total, European Satellites	8,560	3,390	1,180	2,370	870	750	4,340	12,900	
Total, Soviet Bloc	15,660	9,450	1,860	2,730	870	750	14,440	30,100	100

a. Including all receivers capable of short-wave reception (frequencies above 1.6 megacycles per second -- mc).
b. These receivers are capable of receiving a range through the frequency indicated but do not receive the higher frequencies indicated in the column to the right.
c. These receivers are capable of receiving frequencies ranging through 26 mc but less than 30 mc.
d. Totals are derived from unrounded figures and do not always agree with the sum of the rounded components.
e. 1/ For serially numbered source references, see Appendix B.
f. 2/
g. 3/
h. 4/
i. 5/
j. 6/
k. 7/

Table 2

Estimated Production
of Radiobroadcast Receivers in the USSR
1945-56

Thousand Units

Year	Quantity	Year	Quantity
1945	100	1952	1,285
1946	272	1953	1,630
1947	314	1954	2,870
1948	518	1955	3,500
1949	856	1956	3,600
1950	1,042		
1951	1,210	Total	17,197

Table 3

Estimated Number
of Radiobroadcast Receivers in Use in the USSR
1945-56

Thousand Units

Year	Quantity	Year	Quantity
1945	1,300	1951	2,036
1946	1,325	1952	2,155
1947	1,436	1953	2,717
1948	1,547	1954	4,730
1949	1,658	1955	6,100
1950	1,770	1956	9,600

2. European Satellites.

The total number of receivers produced in the European Satellites during 1945-56 was about 12.9 million. (See Table 4.) With the exception of Albania, all of the Satellites have produced receivers during this period. East Germany, Czechoslovakia, Hungary, and Poland have exported significant quantities of receivers to countries of the Soviet Bloc having limited or no productive capacity. Relatively few receivers have been exported outside the Bloc.

Table 4

Estimated Production of Radiobroadcast Receivers in the European Satellites a/
1945-56

Thousand Units

Year	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania	Total
1946	Negligible	105	60	11	0	0	176
1947	Negligible	160	100	15	7	0	282
1948	2	268	150	24	37	1	482
1949	3	256	220	70	66	12	627
1950	7	245	277	100	112	25	766
1951	8	230	548	165	150	40	1,141
1952	10	270	659	140	210	45	1,334
1953	26	320	766	150	268	75	1,605
1954	83	340	897	182	308	100	1,910
1955	125	374	763	373	460	125	2,220
1956	160	400	810	400	460	140	2,370
Total	424	2,968	5,250	1,630	2,078	563	12,913

a. There was no production in 1945.

Eight and one-half million receivers, or 66 percent, of the 12.9 million receivers produced during 1945-56 are estimated to be capable of short-wave reception. (See Table 5.) There is no indication that a restriction has been placed on the production of short-wave receivers in the European Satellites such as has been reported in the USSR. Approximately 60 percent of the short-wave receivers produced, or about 5.2 million, are believed to be capable of receiving frequencies of 15 mc or above. (See Tables 6 and 7.*)

Table 5

Estimated Production of Short-Wave Radiobroadcast Receivers in the European Satellites, by Capability for Frequency Reception 1945-56

Thousand Units

Country	12 mc a/	15 mc a/	17 mc a/	21 mc a/	26 mc a/	Total
Bulgaria	89	15	46	0	0	150
Czechoslovakia	49	280	703	565	703	2,300
East Germany	1,650	290	1,160	Negligible	0	3,100
Hungary	363	98	196	294	49	1,000
Poland	1,242	372	186	Negligible	0	1,800
Rumania	0	125	75	13	0	213
Total	3,393	1,180	2,366	872	752	8,563

a. Including all receivers capable of short-wave reception (frequencies above 1.6 megacycles per second -- mc).

* Tables 6 and 7 follow on p. 9.

Table 6

Estimated Production
of Short-Wave Radiobroadcast Receivers
in the European Satellites
as Percentages of Total Production
1945-56

Country	Percent
Bulgaria	35
Czechoslovakia	77
East Germany	59
Hungary	61
Poland	87
Rumania	36

Table 7

Estimated Percentages of Radiobroadcast Receivers Produced
in the European Satellites
by Capability for Frequency Reception a/
1945-56

Percent

Country	12 mc b/	15 mc b/	17 mc b/	21 mc b/	26 mc b/
Bulgaria	59	10	31	0	0
Czechoslovakia	2	12	30	25	31
East Germany	53	9	38	0	0
Hungary	36	10	20	29	5
Poland	69	21	10	0	0
Rumania	0	59	35	6	0

a. These receivers are capable of receiving a range through the frequency indicated but do not receive the higher frequencies indicated in the column to the right.
b. Including all receivers capable of short-wave reception (frequencies above 1.6 megacycles per second -- mc).

It is estimated that at the end of 1956 about 22.5 million receivers were in use in the entire Soviet Bloc and 12.9 million receivers in the European Satellites alone, as shown in Table 8.

Table 8

Estimated Numbers of Radiobroadcast Receivers in Use in the Soviet Bloc at the End of 1956

Thousand Units

Country	Quantity
USSR	9,600
European Satellites	
Albania	25
Bulgaria	350
Czechoslovakia	3,200
East Germany	5,200
Hungary	1,380
Poland	1,960
Rumania	800
Total, European Satellites	12,915
Total, Soviet Bloc	22,515

One-half of the receivers in use, or between 10 million and 12 million, are estimated to have short-wave bands. These receivers with short-wave bands are capable of receiving radiobroadcasts from outside the Soviet Bloc.

APPENDIX A

METHODOLOGY

1. USSR.

a. General.

The primary basis for estimates of annual production of receivers in the USSR has been open Soviet announcements. Soviet figures have been consistent and are believed to be reasonably accurate. 8/

Classes and characteristics of receivers have been determined primarily through use of descriptive data published by the USSR and to a lesser degree through exploitation of receivers acquired from various sources.* 9/ Characteristics have varied from time to time for particular receivers. The typical characteristics for a given class of receivers, therefore, must be related to the period of production. The characteristic with which this report is concerned is the capability for frequency reception of the receiver.

Short-wave receivers produced during 1945-53 tended to have a higher capability for frequency reception than did those produced during 1954-56. It was reported that receivers produced in 1953 or 1954 would not be capable of receiving frequencies above 12 mc, 10/ and no receivers produced since 1954 have been noted to have a capability for frequency reception above 12 mc. Some small percentage of production, however, may include the higher frequencies.

b. 1945-53.

During 1945-53, 7.2 million receivers are estimated to have been produced in the USSR. From 1945 through 1948 a greater proportion of production was devoted to the better quality receivers. Production was small, however, compared with production from 1949 through 1953. From 1949 through 1953, production of Class 4 and crystal receivers is believed to have accounted for over one-half of total production. An estimate that one-half of all receivers produced during the entire period 1945-53 were Class 4 and crystal receivers appears reasonable. None of these had capabilities for short-wave reception.

* For a discussion of receivers by class, see footnote, p. 12.

Included in the remaining 3.5 million receivers are the Iskra and some models of the Arz and the Moskvich receivers. These receivers, which have no short-wave bands, were produced in considerable quantities. Average annual production of each of these 3 receivers from 1949 through 1953 may have been from 100,000 to 150,000 units, or a total of about 1.5 million units. By deducting these from the remaining 3.5 million receivers, it is estimated that about 2 million receivers with short-wave bands were produced. There are 8 types of receivers capable of receiving short-wave frequencies, ranging through 12 mc, 5 capable of receiving through 15 mc, and 3 capable of receiving through 17 mc. By weighting two receivers of the first group 3 times (the Rekord and the Rodina) and one 2 times (the Riga T-755) and weighting one of the second group 2 times (the Ural), the percentage mix by respective groups is estimated to be about 60 percent capable of receiving through a range of 12 mc, 30 percent through a range of 15 mc, and 10 percent through a range of 17 mc.

A second method of estimating the number of short-wave receivers produced during 1945-53 is not entirely independent of the first method but does tend to support the results. Based on previously computed estimates 11/ of annual production by class,* the percentage of total production by class of receiver during 1945-53 is found to be 3 percent, Class 1; 13 percent, Class 2; 16 percent, Class 3; 22 percent, Class 4; and 46 percent, unclassified. Total production for the period was about 7.2 million receivers. Quantities by class are then 216,000, Class 1; 936,000, Class 2; 1,152,000, Class 3; 1,584,000, Class 4; and 3,312,000, unclassified. Class-1, Class-2, and one-half of Class-3 receivers are estimated to have short-wave bands. The total number of short-wave receivers then amounts to 1,728,000 units. About one-half of the Class 1 receivers

* Receivers produced in the USSR before 1956 have been classified according to their quality and fidelity into Class 1, Class 2, Class 3, Class 4, and a category with no class designation (simple, low-quality types). Class-1 receivers in this system are the best quality receivers, with the quality decreasing with the increasing magnitude of the class number.

Receivers to be produced after 1956 under the Sixth Five Year Plan (1956-60) will be of the following classes: High (Luxury) Class, Class 1, and Class 2. No class designation has been noted for Classes 3 and 4, and it is possible these types have been eliminated by raising the level of quality of the new types.

have short-wave bands ranging through 15 mc, one-fourth through 17 mc, and the remaining through 12 mc. One-fifth of the Class 2 receivers have short-wave bands ranging through 15 mc, one-sixth through 17 mc, and the remaining through 12 mc. One-fourth of the Class 3 receivers have short-wave bands ranging through 15 mc, one-sixth through 17 mc, and the remaining through 12 mc. The resulting estimate for production during 1945-53 is 983,000 receivers with short-wave bands ranging through 12 mc, 439,000 through 15 mc, and 306,000 through 17 mc.

On the basis of the total estimate of 2 million short-wave receivers, the respective percentages for the two methods were averaged and a percent-mean total derived. The percentage mix based on the production of individual types of receivers was 12 mc, 60 percent; 15 mc, 30 percent; and 17 mc, 10 percent. The percentages based on computed estimates of annual production by class yielded a percentage mix of 12 mc, 57 percent; 15 mc, 25 percent; and 17 mc, 18 percent. The average percentages based on the estimated total of 2 million short-wave receivers resulted in the percentage mix of 58 percent for 12 mc, or 1,160,000; 28 percent for 15 mc, or 560,000; and 14 percent for 17 mc, or 280,000.

c. 1954-56.

Production of receivers in the USSR from 1954 through 1956 is estimated to be about 10 million units. Production of better quality receivers was considerably increased, resulting in a greater percentage of receivers with short-wave bands. The short-wave bands, however, reportedly were limited to a maximum frequency of 12 mc. Although no exception to the limitation on maximum frequency has been noted, a small number of receivers may have been produced for special groups or purposes.

The method used to estimate production of short-wave receivers from 1954 through 1956 was as follows. Plants producing significant quantities of receivers in 1955 were ranked in three groups in relation to their estimated production. 12/ It is estimated that, in 1955, 7 plants produced from 100,000 to 500,000 receivers, 13 produced from 50,000 to 100,000, and 5 produced fewer than 50,000. These plants then were charged with the responsibility for production of the classes of receivers reported as having been produced in the year 1955. If reported information on these plants was lacking, their production in 1955 was based on their previous history of production, with a minimum of weighting used throughout. The result of these computations

indicates percentages of production by class mix to be as follows: Class 1, 10 percent; Class 2, 35 percent; Class 3, 20 percent; and Class 4, 35 percent. The percentage for Class 2 in 1955 is somewhat higher than for earlier years and higher than production of this class reported by a Soviet source. 13/ In view of the approximate method used and the reported Soviet comment which stated that Class 1 and Class 2 receivers would account for 35 percent of 1955 production, the class percentage was adjusted downward. The result and that used in the estimate for the period is as follows: Class 1, 10 percent; Class 2, 25 percent; Class 3, 20 percent; and Class 4, 45 percent. All Class 1 and Class 2 receivers and 80 percent of Class 3 receivers produced during the period, approximately 5.1 million units, have short-wave bands. It is unlikely that receivers capable of receiving frequencies above 12 mc were completely eliminated from production, especially because, during 1945-53, 28 percent of the Class 1 receivers had short-wave bands ranging through 15 mc and 14 percent through 17 mc. It is estimated, therefore, that from 1954 through 1956 there were 5.1 million short-wave receivers produced. Of this total, 120,000 receivers ranged through 15 mc, 4.9 million through 12 mc, and 80,000 through 17 mc.

Production during 1945-56 is the sum of the 2 periods, or 17.2 million receivers. Production of short-wave receivers totals 7.1 million units; receivers with bands ranging through 12 mc, 6.06 million; receivers with bands ranging through 15 mc, 680,000; and receivers with bands ranging through 17 mc, 360,000.

d. In Use.

The estimate of receivers in use in the USSR at the end of 1956 is based on official published Soviet statistics and is relatively low in terms of the total number of receivers produced in the USSR since 1945. The primary reason for the low estimate of receivers in use is the retirement of a significant number of older receivers. Moreover, it is possible that a number of Soviet receivers which have been manufactured and sold may not have been counted in use for the following reasons: (1) Soviet published data may not include receivers in use which have not been licensed, and (2) the published figures for receivers in use may exclude small crystal receivers.

2. European Satellites.

a. General.

Estimates of production of receivers by each of the European Satellites during 1945-56 are shown in Table 3.* Adjustments of older estimates

* P. 5, above.

and projections of estimates through 1956 are based on announced plans and/or announcements of plan fulfillment, where available. Growth factors of production which follow an indicated trend have been applied where other supporting information is lacking.

Production of receivers by capability for frequency reception is shown in Table 4.* Estimates for the earlier years are based on earlier reports. For the years since 1953, the period of greatest production, information on frequency capabilities is weak; and estimates are based on the characteristics of those types of receivers which are believed to have been produced in the greatest quantities.

Determination of the capability for frequency reception of the various models of receivers is very difficult and in many instances not possible. For example, Polish receivers are noted to have different frequency bands for individual models depending on whether the receiver is intended for export or for domestic consumption. This variation probably applies to the receivers produced by other European Satellites, in particular to the larger, older producers such as East Germany, Czechoslovakia, and Hungary.

Another factor which hinders the determination of the frequency mix is the increased number of models of receivers being produced. More models seem to have been produced since 1953 than in previous years.

Production of receivers with short-wave bands as a percentage of total production of receivers is greatest in Poland, least in Bulgaria.

The estimated percentages of total receivers produced in the European Satellites, by capability for frequency reception, are shown in Table 6.** If the information contained in Table 5*** is compared with that in Table 6, it is apparent that although Poland produced a larger ratio of short-wave receivers, the range of the capability for frequency reception is limited to the lower end of the frequency band. Czechoslovakia and Hungary produce a larger proportion of receivers with capability for frequency reception in the upper range of the frequency band.

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* P. 7, above.
** P. 9, above.
*** P. 8, above.

b. In Use.

The estimated number of receivers in use in the European Satellites by the end of 1956 is given in Table 8.* East Germany has the greatest number of receivers and Albania the least.

By comparing Table 3** with Table 8, it is found that the number of receivers in use in Czechoslovakia, East Germany, and Rumania exceeds the total number produced during 1945-56. Czechoslovakia and East Germany probably have a considerable number of receivers in use which were produced before 1945. Rumania either may have older receivers in use or may have imported some receivers.

Again, by comparing Table 3 with Table 8, it is found that Bulgaria, Hungary, and Poland have produced a greater number of receivers than they have in use. These countries are believed to have exported considerable quantities of receivers.

No attempt has been made in this report to estimate the distribution of receivers by capability for frequency reception, because information is fragmentary and does not lead to valid conclusions. In general, the pattern of distribution for receivers is believed to follow the pattern of distribution for the population of the individual countries, with the more complex and expensive types of receivers belonging to the higher income groups in the larger cities.

Estimates of receivers in use are based, for the most part, on open-source announcements by the European Satellites. Estimates through 1955 have been projected through 1956 by applying a growth factor which has been typical of recent years. 14/

* P. 10, above.
** P. 5, above.

APPENDIX B

SOURCE REFERENCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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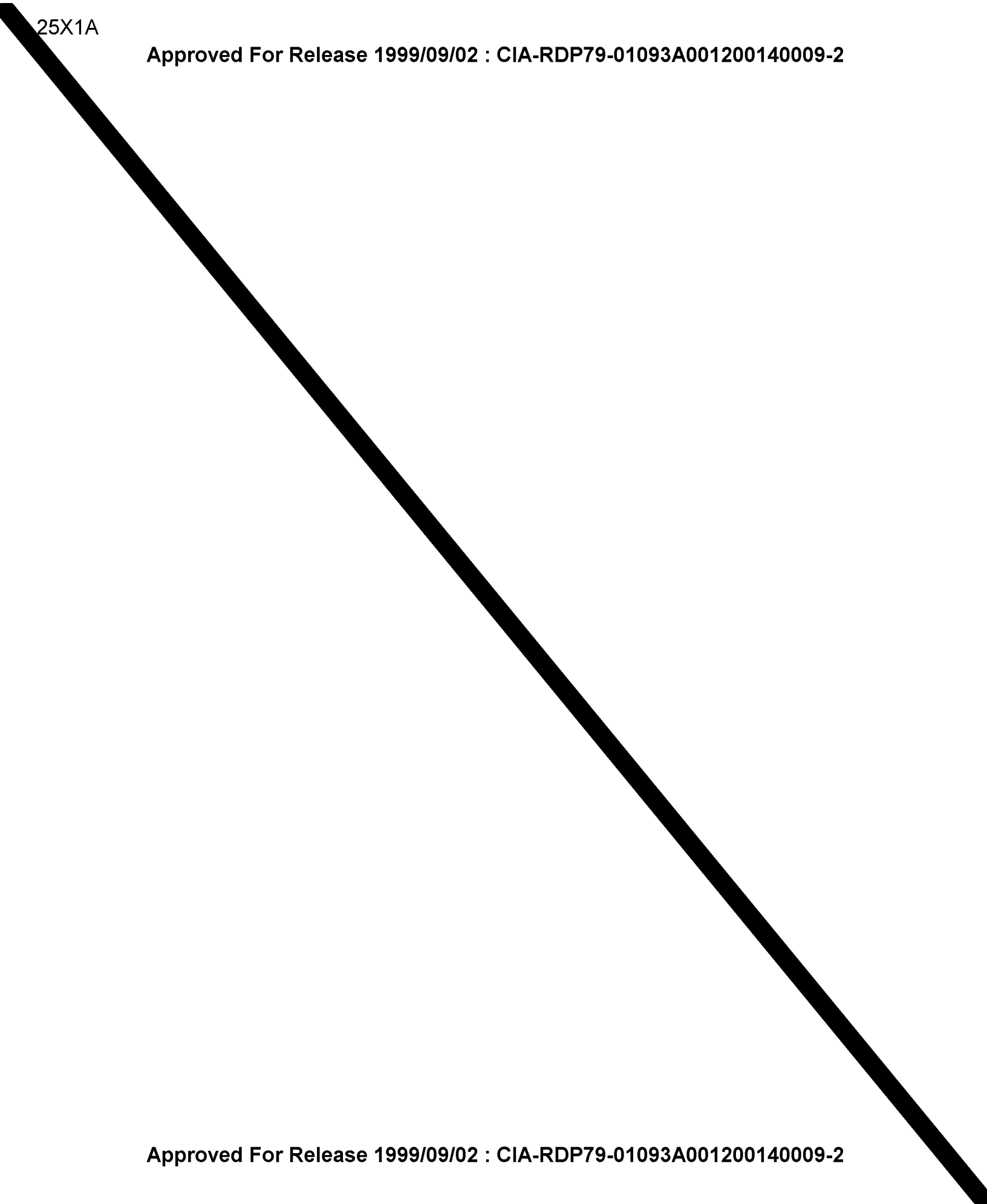

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